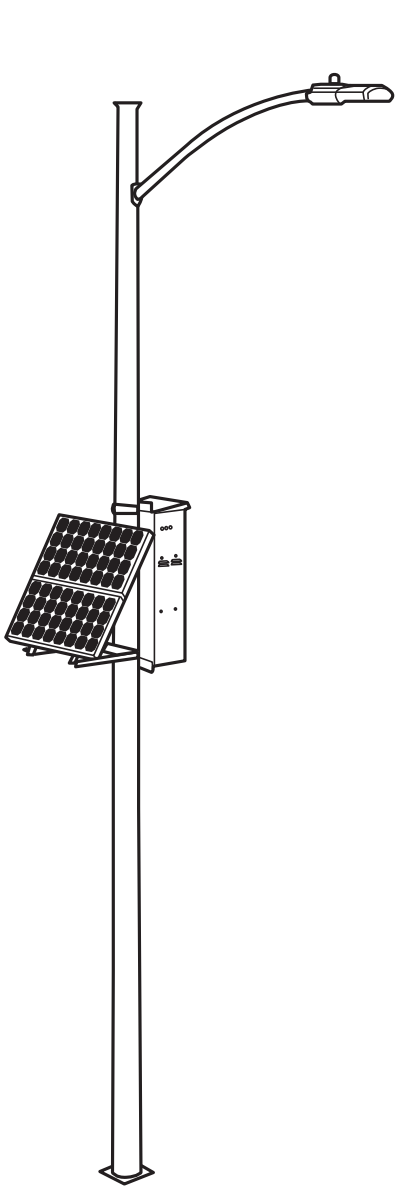
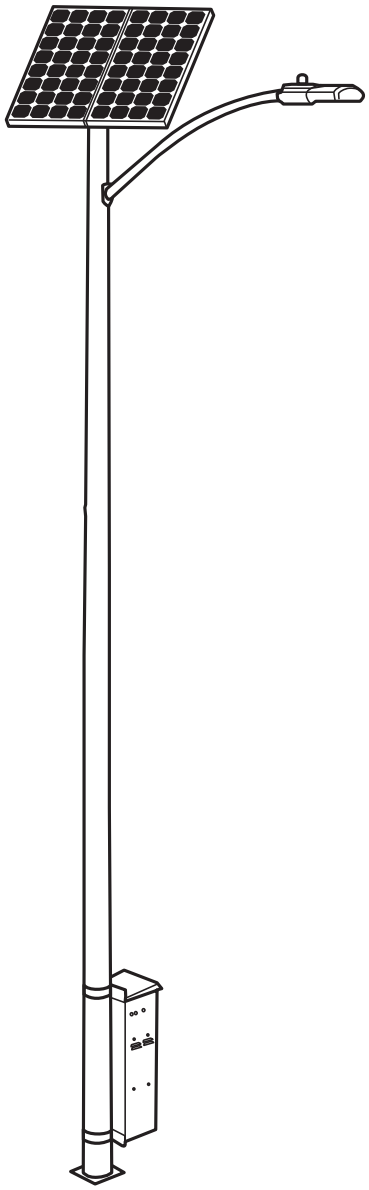
carmanah®

EVERGEN 1500 SERIES

MODELS 1520, 1530

USER MANUAL





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Warnings and Precautions

The following symbols indicate important safety warnings and precautions throughout this manual. They are defined as follows:

WARNING indicates that serious bodily harm or death may result from failure to adhere to the precautions.

CAUTION indicates that damage to equipment may result if the instructions are not followed.

NOTE suggests optimal conditions under which the equipment will operate effectively and safely, or provides additional information to the reader.

Warranty Disclaimer

This manual will familiarize you with the features and operation standards of Carmanah's EverGEN 1500 series models 1520 and 1530. Failure to comply with the use, storage, maintenance, installation or placement instructions detailed in this manual could void the applicable user warranty.

Standards

Perform all installation, wiring and maintenance in conformance with local building and electrical codes. Adherence to the National Electrical Code (NEC) or Canadian Electrical Code (CEC) is mandatory to comply with the UL, CSA, or any other certification markings. Non-adherence to code may void the warranty.

Safety and Usage Precautions

Batteries are shipped fully-charged. Use extreme caution when handling the batteries as they are capable of generating hazardous short-circuit currents. Remove all jewelry (bracelets, metal-strap watches, etc.) before attempting to handle the batteries.

Solar Modules produce DC electricity when exposed to light and can, therefore, produce an electrical shock or burn. To render Solar Modules inoperative, remove them from sunlight, or fully cover their front surface with an opaque material.

Before lifting any heavy or bulky equipment, ensure that the load is secured so that moving parts do not shift and it can be lifted as far as needed without back strain or loss of grip. Installation may require more than one person.

Until the system is ready for start-up, turn off all circuit breakers during installation and wiring of the system.

Re-check all completed wiring for proper polarity prior to energizing the system.

On Start-Up, follow the procedures described in the Functional Test section of this document.

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Introduction

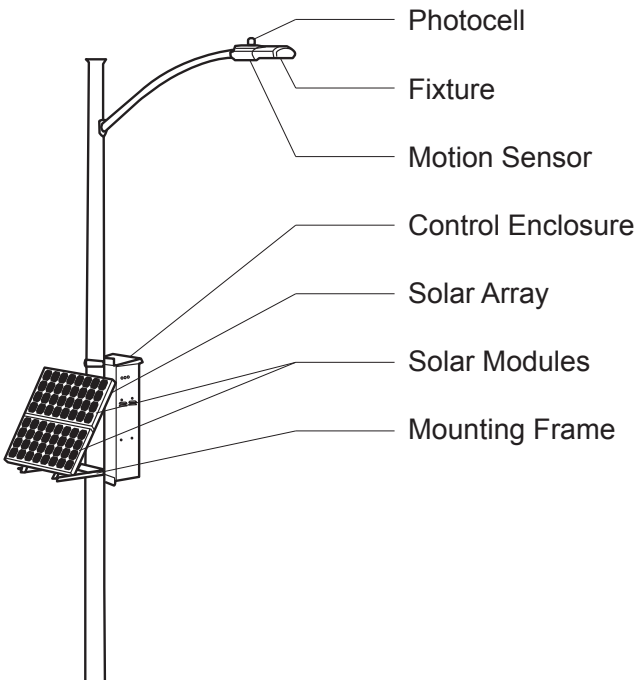
The EverGEN 1500 Series of Solar LED Lighting Systems is available in two different sizes:

- EverGEN 1520 – a two-panel solar LED lighting system
- EverGEN 1530 – a three-panel solar LED lighting system

The system size that is appropriate for your application depends on your geographic location, your application requirements, and the use of Operating Profiles and Motion Sensing capabilities.

The EverGEN 1500 is useful for the following applications:

- Parking lot lighting
- Site lighting
- Residential street lighting



Features and Functionality

The EverGEN 1500 series has the following features and functionality:

- Leading-edge BetaLED fixtures offer superior thermal management, optical control, and uniformity
- An intelligent Energy Management System (EMS) that optimizes battery charging and discharging; preserving battery integrity and ensuring reliable system performance
- Intelligent Operating Profile and Motion Sensing capabilities allow for functionality that meets location and application requirements
- Leading high efficiency solar panels
- UL rated, weather-resistant system components
- FCC compliance
- RoHS certified – fully recyclable components
- Five year system warranty

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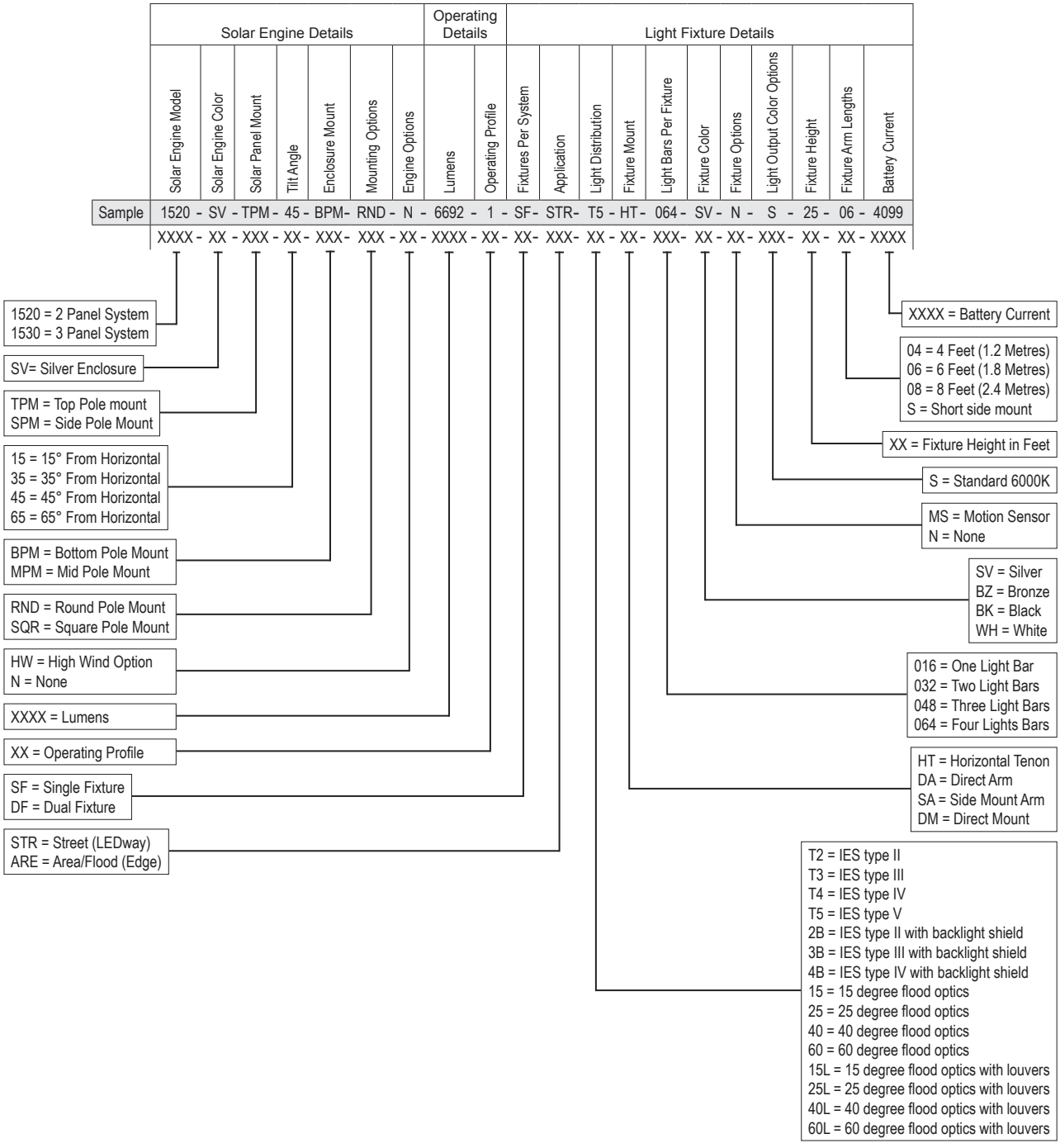
Interpreting Your Part Number/Order Key

Your EverGEN 1500's Part Number Key completely describes the configuration of the system that you ordered and describes how to install it. If a lighting lay out was completed by Carmanah, this key is referenced on the luminaire schedule to indicate where each system should be located on the site.

The following table describes each section of the Part Number Key (also referred to as the Order Key).


Solar Engine Details
Operating Details
Light Fixture Details
Solar Engine Model
Solar Engine Color
Solar Panel Mount
Tilt Angle
Enclosure Mount
Mounting Options
Engine Options
Lumens
Operating Profile
Fixtures Per System
Application
Light Distribution
Fixture Mount
Light Bars Per Fixture
Fixture Color
Fixture Options
Light Output Color Options
Fixture Height
Fixture Arm Lengths
Battery Current
Sample
1520 - SV - TPM - 45 - BPM - RND - N - 6692 - 1 - SF - STR - T5 - HT - 064 - SV - N - S - 25 - 06 - 4099
XXXX - XX - XXX - XX - XXX - XXX - XX - XXXX - XX - XX - XXX - XX - XX - XXX - XX - XX - XXX - XX - XX - XXX - XX - XX - XXXX
1520 = 2 Panel System
1530 = 3 Panel System
SV= Silver Enclosure
TPM = Top Pole mount
SPM = Side Pole Mount
15 = 15° From Horizontal
35 = 35° From Horizontal
45 = 45° From Horizontal
65 = 65° From Horizontal
BPM = Bottom Pole Mount
MPM = Mid Pole Mount
RND = Round Pole Mount
SQR = Square Pole Mount
HW = High Wind Option
N = None
XXXX = Lumens
XX = Operating Profile
SF = Single Fixture
DF = Dual Fixture
STR = Street (LEDway)
ARE = Area/Flood (Edge)
T2 = IES type II
T3 = IES type III
T4 = IES type IV
T5 = IES type V
2B = IES type II with backlight shield
3B = IES type III with backlight shield
4B = IES type IV with backlight shield
15 = 15 degree flood optics
25 = 25 degree flood optics
40 = 40 degree flood optics
60 = 60 degree flood optics
15L = 15 degree flood optics with louvers
25L = 25 degree flood optics with louvers
40L = 40 degree flood optics with louvers
60L = 60 degree flood optics with louvers
HT = Horizontal Tenon
DA = Direct Arm
SA = Side Mount Arm
DM = Direct Mount
016 = One Light Bar
032 = Two Light Bars
048 = Three Light Bars
064 = Four Lights Bars
SV = Silver
BZ = Bronze
BK = Black
WH = White
MS = Motion Sensor
N = None
S = Standard 6000K
XX = Fixture Height in Feet
04 = 4 Feet (1.2 Metres)
06 = 6 Feet (1.8 Metres)
08 = 8 Feet (2.4 Metres)
S = Short side mount
XXXX = Battery Current

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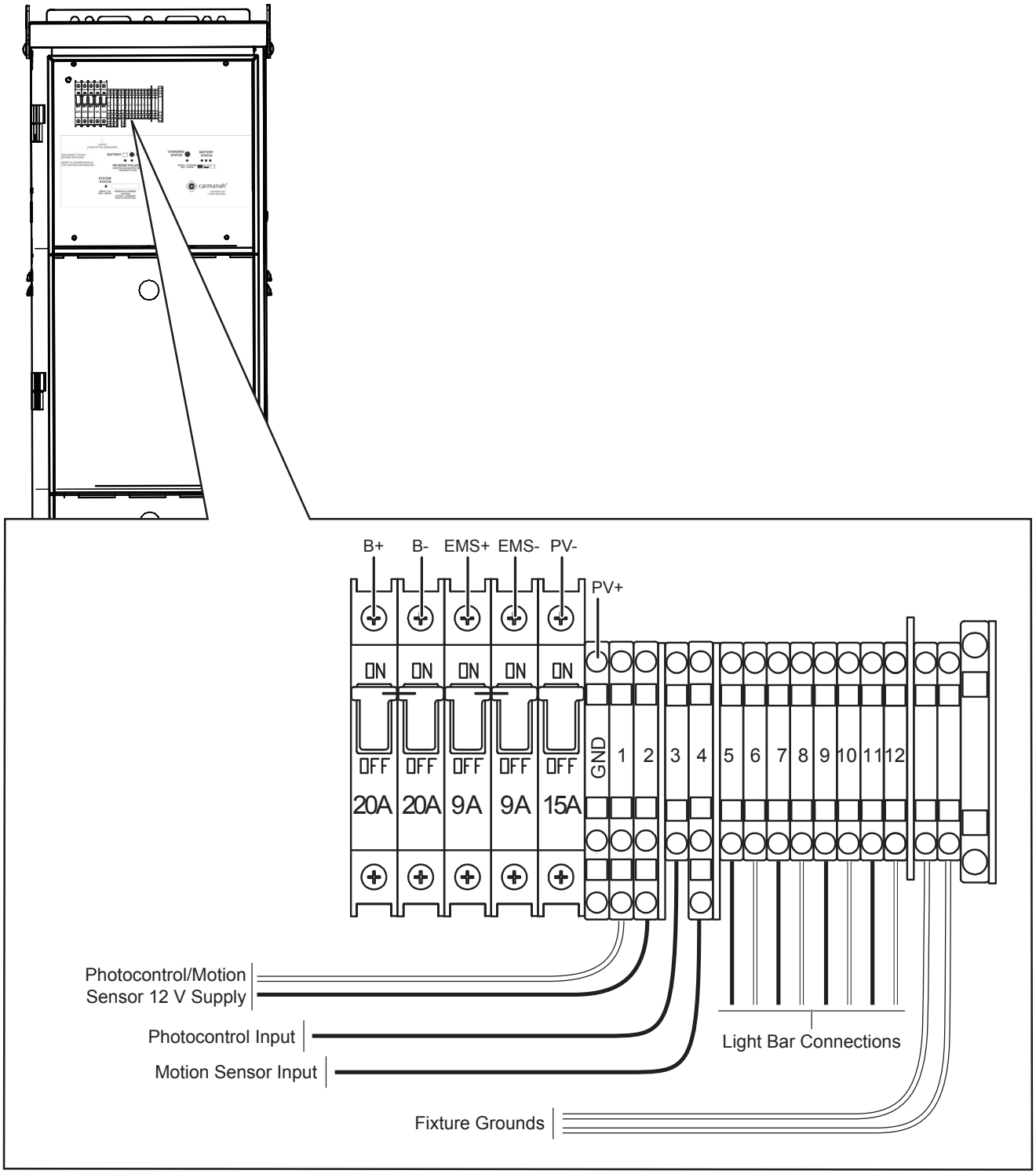
Control Enclosure

The Control Enclosure contains the EverGEN 1500 Series' Control Panel, which provides the controls and indicators needed to adjust, control and monitor the unit's day-to-day operation.



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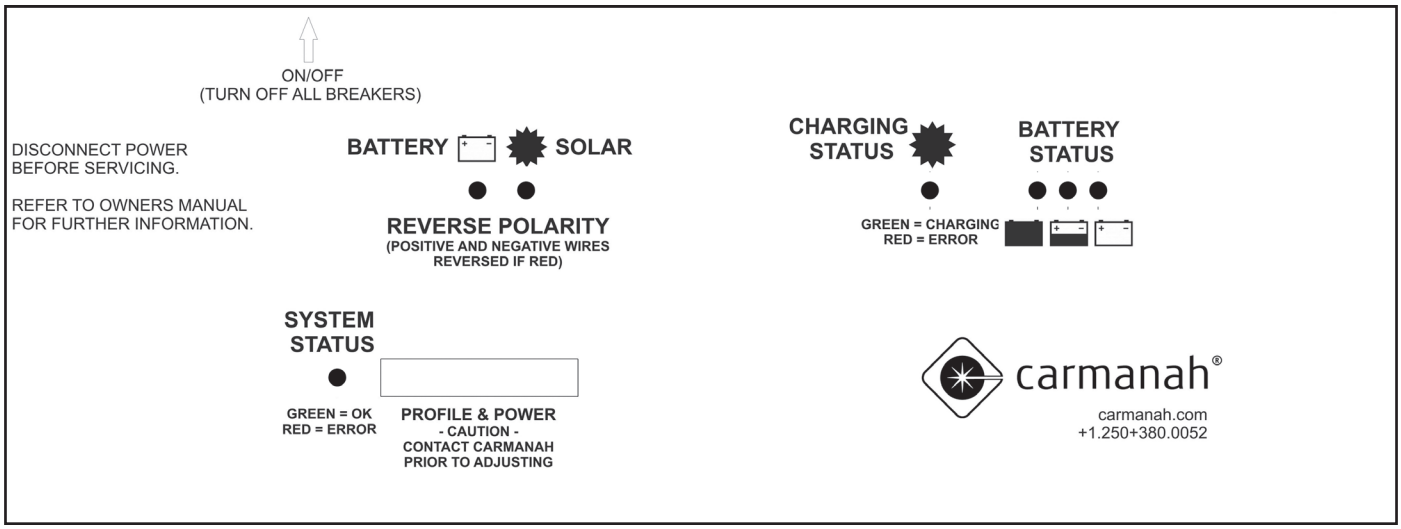

The following table describes each of the indicators on the Control Panel.

Control Panel Item	Description
Reverse Polarity	The EverGEN 1500 is fully protected against reverse polarity, as indicated by the two LEDs located at the front panel (as above): one for the Solar Array, and one for the Battery Bank. If the Solar Array or Battery Bank is wired in a reverse polarity situation, the corresponding LED indicator turns red. If no LED indicators are lit, it means the system is wired correctly. If a reversed polarity situation occurs, turn off the breakers, check the wiring, fix the polarity issue, and then put the breakers back on. The system resumes operation without any damage.
System Status	The System Status LED flashes green if the EMS is operating properly, and flashes red if there is a system error. The LED flashes once per second if the system detects low battery voltage, and twice per second if it does not detect a day-to-night transition within a 24 hour period.
Charging Status	The Charging Status LED indicates charging status and any existing solar-input error conditions. The LED is on while the system is charging during the day, and off at night. It flashes red whenever an error condition(s) exists. The following table lists the Charging Status LED indications

Color	Indication	Operating State
None	Off (with heartbeat[1])	Night
Green	On Solid (with heartbeat[2])	Charging
Red	Flashing	Error
Red	On Solid (with heartbeat[2])	Critical Error

[1] heartbeat indication flickers the Charging Status LED on briefly every five seconds
[2] heartbeat indication flickers the status LED off briefly every five seconds

For more information on Charging Status LED errors, see Appendix A: Error Codes

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<table>
<tr><th>Control Panel Item</th><th>Description</th></tr>
<tr><td>Battery Status</td><td>
The three Battery Status LEDs indicate the battery's State of Charge (SOC):

A solid green LED means the battery is at full charge, a solid yellow LED means the battery is half charged, and a solid red LED means the battery charge is less than 25%.

The SOC indication is based on battery voltage set points, which provide an approximation of the actual state of charge of the battery.

The three LEDs also indicate the charging stage, for example, a fast-flashing green LED (two flashes/sec) indicates the absorption charge stage.

The following table lists the SOC LED indications.

<table>
<tr><th>SOC LED</th><th>Indication</th><th>Battery Status</th><th>Load Status</th></tr>
<tr><td>Green</td><td>Fast Flashing
(2 flash / sec)</td><td>Equalize Charge</td><td>Load On</td></tr>
<tr><td>Green</td><td>Med Flashing
(1 flash / sec)</td><td>Absorption Charge</td><td>Load On</td></tr>
<tr><td>Green</td><td>Slow Flashing
(1 flash / 2 sec)</td><td>Float Charge</td><td>Load On</td></tr>
<tr><td>Green</td><td>On Solid</td><td>Nearly Full</td><td>Load On</td></tr>
<tr><td>Yellow</td><td>On Solid</td><td>Half Full</td><td>Load On</td></tr>
<tr><td>Red</td><td>Flashing
(1 flash / sec)</td><td>Battery Low</td><td>LVD Warning
(Load On)</td></tr>
<tr><td>Red</td><td>On Solid</td><td>Battery Empty</td><td>LVD
(Load Off)</td></tr>
</table>

If multiple battery SOC LEDs are flashing, an error condition exists. Refer to Appendix A: Error Codes for more information.
</td></tr>
<tr><td>EMS Profile and Power</td><td>
The Energy Management System (EMS) is configured at the factory, based on the profiles you selected when ordering the unit. Should the installation location or situation change, you can adjust these settings to compensate for poorer insolation.

Contact your Carmanah representative before editing any EMS settings. Editing the settings may result in battery damage if the Operating Profile and power settings are not edited correctly.

Refer to page 16 for EMS access and selection of Operating Profiles.
</td></tr>
<tr><td>Battery Circuit Breakers</td><td>Two 20A DC rated circuit breakers provide the battery bank with both disconnect and over current protection. These breakers supply power to the EMS charge controlling circuitry and are the first breakers you should turn on when starting the system.</td></tr>
<tr><td>EMS Circuit Breaker</td><td>Two 9A DC rated circuit breakers provide a means of disconnecting power to the light fixture driving circuitry.</td></tr>
</table>

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Control Panel Item	Description
PV Circuit Breaker	One 15A DC rated circuit breaker provides disconnect and over current protection for the PV circuit, it connects the Solar Modules to the charge controller. This breaker must only be turned on after the Battery Circuit Breakers are on.
Terminal Block	Spring gauge terminal blocks are provided to make the connection from the Solar Modules and Fixture to the Control Enclosure.

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Operating Profiles

The EverGEN 1500's Operating Profiles determine how the Fixture behaves. For example, an Operating Profile can allow the LEDs to dim or turn off completely during times when facility usage is reduced. Operating Profiles can also incorporate Motion Sensing to switch on and off or between high and low intensities.

The EverGEN 1500 comes with 63 operating profiles. There are currently eight Operating Profile Types available. Two categories (Fixed Night and Split Night) do not use the Motion Sensor technology, the rest do.

NOTE Always consult Carmanah before changing the Operating Profile

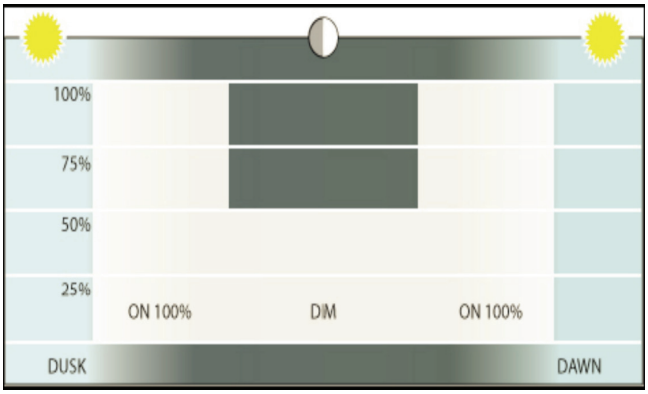
1. Fixed Night [Dusk Plus X]

The LEDs illuminate at dusk at full intensity for a fixed number of hours and then turn off. Dusk to dawn operation (with the LEDs illuminated at full intensity all night) is available with the fixed night operating profile category.

Profile No.	SW1 Switch Positions								Operating Profile
	1	2	3	4	5	6	7	8	
	0	0	0	0	0	0	0	0	Reserved
1	1	0	0	0	0	0	1	0	Dusk + 2
2	0	1	0	0	0	0	1	0	Dusk + 4
3	1	1	0	0	0	0	1	0	Dusk + 6
4	0	0	1	0	0	0	1	0	Dusk + 8
5	1	0	1	0	0	0	1	0	Dusk - Dawn (All Night)

2. Split Night [X-Y% Low- Z]

The X - Y%Low - Z profile illuminates the LEDs at full brightness for X hours after dusk, and Z hours before dawn. Between X and Z, the EMS reduces the LED output brightness to Y% of peak brightness The LEDs illuminate at dusk at full intensity for a fixed number of hours, then dim to a percentage of full intensity for a fixed number of hours, and finally return to full intensity for a fixed number of hours before dawn.



Profile No.	SW1 Switch Positions								Operating Profile
	1	2	3	4	5	6	7	8	
6	0	1	1	0	0	0	1	0	5 - 25%Low - 2
7	1	1	1	0	0	0	1	0	5 - 25%Low - 4
8	0	0	0	1	0	0	1	0	7 - 25%Low - 2
9	1	0	0	1	0	0	1	0	7 - 25%Low - 4
10	0	1	0	1	0	0	1	0	5 - 50%Low - 2
11	1	1	0	1	0	0	1	0	5 - 50%Low - 4
12	0	0	1	1	0	0	1	0	7 - 50%Low - 2
13	1	0	1	1	0	0	1	0	7 - 50%Low - 4

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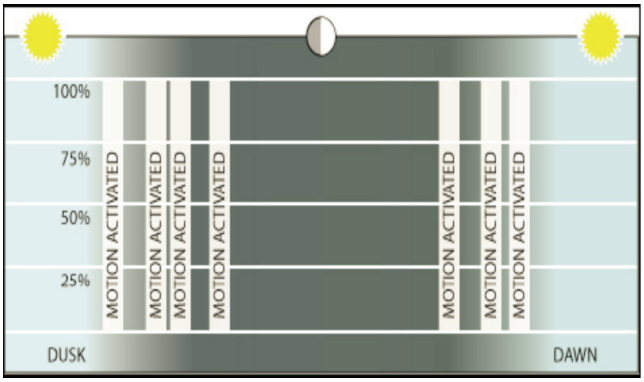
3. Off-On [off-onX]

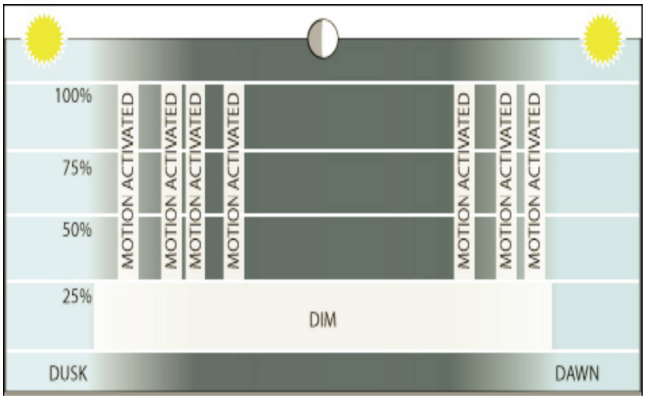
LEDs remains off unless activated by the Motion Sensor. Off-OnX profiles are driven by the Motion Sensor. The LEDs remains off until the Motion Sensor detects an event. The X refers to the maximum hours that the LEDs can be cumulatively enabled (from the Motion Sensor) in one night. For example Off-on2, the profile is enabled at dusk and disabled at dawn, the maximum allowable hours that the LEDs can be on is two hours. The numbers of activations within the two hours are determined by the time delay set on the Motion Sensor, so if the time delay is set to 15 minutes then the maximum number of activation is eight. If the Motion Sensor is activated at night, but the budget for Motion Sensor activation time allotted by the operating profile has already been met for that evening, the system illuminates immediately (to peak brightness) and then ramps off over a five second period.



Profile No.	SW1 Switch Positions								Operating Profile
	1	2	3	4	5	6	7	8	
14	0	1	1	1	0	0	1	0	Off-On2
15	1	1	1	1	0	0	1	0	Off-On4
16	0	0	0	0	1	0	1	0	Off-On6
17	1	0	0	0	1	0	1	0	Off-On8

4. Low/High [X% Low- High Y]

X%Low - HighY profiles illuminate at X% brightness from dusk until dawn. The LEDs maintains a cumulative nightly Motion Sensor budget of Y hours (at peak brightness). For example, the LEDs remain illuminated at a percentage of full intensity until activated by the Motion Sensor to use 100% intensity.



Profile No.	SW1 Switch Positions								Operating Profile
	1	2	3	4	5	6	7	8	
18	0	1	0	0	1	0	1	0	25%Low - High2
19	1	1	0	0	1	0	1	0	25%Low - High4
20	0	0	1	0	1	0	1	0	25%Low - High6
21	1	0	1	0	1	0	1	0	50%Low - High2
22	0	1	1	0	1	0	1	0	50%Low - High4
23	1	1	1	0	1	0	1	0	50%Low - High6

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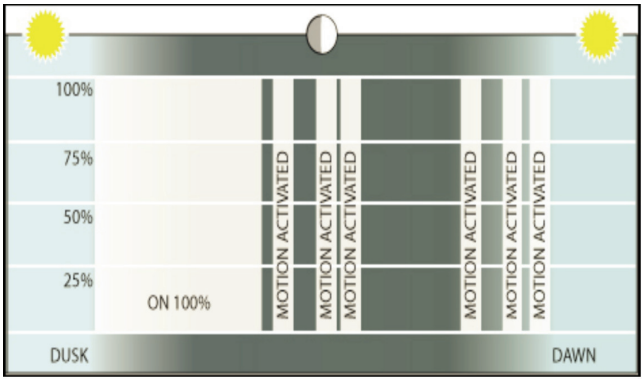
5. Fixed Night + off/on [Dusk + X-off-onY]

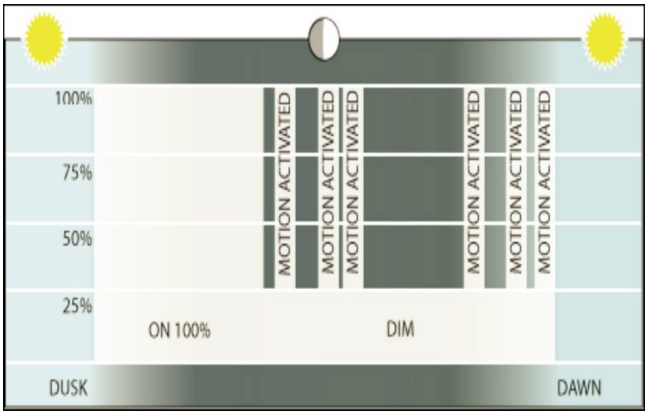
Dusk + X - Off-OnY profiles are Dusk + X profiles with added Motion Sensor functionality. The LEDs illuminate at peak brightness for X hours after dusk. For the remainder of the night, the LEDs remain off – unless a Motion Sensor event is detected. The nightly Motion Sensor budget is Y cumulative hours



Profile No.	SW1 Switch Positions								Operating Profile
	1	2	3	4	5	6	7	8	
24	0	0	0	1	1	0	1	0	Dusk + 3 - Off-On2
25	1	0	0	1	1	0	1	0	Dusk + 4 - Off-On2
26	0	1	0	1	1	0	1	0	Dusk + 5 - Off-On2
27	1	1	0	1	1	0	1	0	Dusk + 6 - Off-On2
28	0	0	1	1	1	0	1	0	Dusk + 3 - Off-On4
29	1	0	1	1	1	0	1	0	Dusk + 4 - Off-On4
30	0	1	1	1	1	0	1	0	Dusk + 5 - Off-On4
31	1	1	1	1	1	0	1	0	Dusk + 6 - Off-On4

6. Fixed Night + Low-High [Dusk +X-Y%Low-HighZ]

Dusk + X - Y%Low - HighZ profiles illuminate the LEDs at peak brightness for X hours after dusk. After a defined period, the brightness is reduced to Y% for the remainder of the night. During the period of reduced brightness, the Motion Sensor is enabled and can be activated for a cumulative Z hours.



Profile No.	SW1 Switch Positions								Operating Profile
	1	2	3	4	5	6	7	8	
32	0	0	0	0	0	1	1	0	Dusk + 2 - 25%Low - High2
33	1	0	0	0	0	1	1	0	Dusk + 2 - 25%Low - High6
34	0	1	0	0	0	1	1	0	Dusk + 2 - 50%Low - High2
35	1	1	0	0	0	1	1	0	Dusk + 2 - 50%Low - High6
36	0	0	1	0	0	1	1	0	Dusk + 4 - 25%Low - High2
37	1	0	1	0	0	1	1	0	Dusk + 4 - 25%Low - High4
38	0	1	1	0	0	1	1	0	Dusk + 4 - 50%Low - High2
39	1	1	1	0	0	1	1	0	Dusk + 4 - 50%Low - High4
40	0	0	0	1	0	1	1	0	Dusk + 6 - 25%Low - High2
41	1	0	0	1	0	1	1	0	Dusk + 6 - 25%Low - High4

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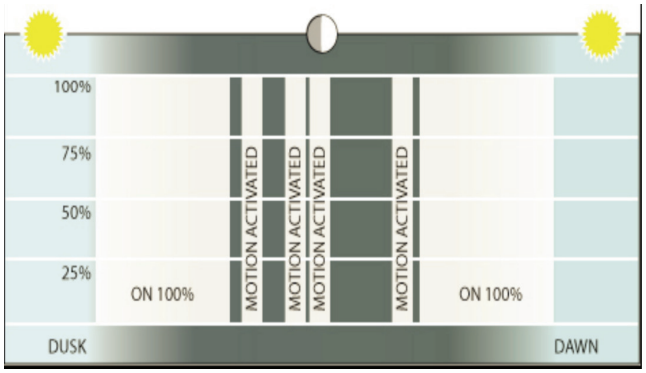
7. Split Night +off-on [X-off-onY-Z]

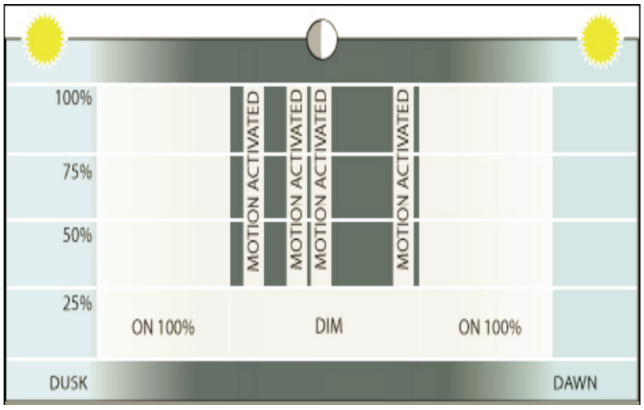
X - Off-OnY - Z profiles illuminate the LEDs at full brightness for X hours after dusk and Z hours before dawn. Between X and Z the LEDs are disabled – pending Motion Sensor events. The Motion Sensor nightly budget is Y cumulative hours. The LEDs illuminate at dusk at 100% intensity for a set number of hours – then the LEDs illuminate at 100% intensity only when motion is detected – then the LEDs illuminate at 100% intensity for a set number of hours before dawn.



Profile No.	SW1 Switch Positions								Operating Profile
	1	2	3	4	5	6	7	8	
42	0	1	0	1	0	1	1	0	2 - Off-On2 - 1
43	1	1	0	1	0	1	1	0	2 - Off-On2 - 2
44	0	0	1	1	0	1	1	0	2 - Off-On4 - 1
45	1	0	1	1	0	1	1	0	2 - Off-On4 - 2
46	0	1	1	1	0	1	1	0	4 - Off-On2 - 1
47	1	1	1	1	0	1	1	0	4 - Off-On2 - 2
48	0	0	0	0	1	1	1	0	4 - Off-On4 - 1
49	1	0	0	0	1	1	1	0	4 - Off-On4 - 2
50	0	1	0	0	1	1	1	0	6 - Off-On2 - 1
51	1	1	0	0	1	1	1	0	6 - Off-On2 - 2
52	0	0	1	0	1	1	1	0	6 - Off-On4 - 1

8. Split Night + Low/High [W-X%Low – HighY – Z]

W - X%Low - HighY - Z profiles illuminate at full brightness for W hours after dusk and Z hours before dawn. Between W and Z the LEDs are enabled at X% of peak brightness. During this dim period, there is a Motion Sensor budget of Y cumulative hours. The LEDs illuminate at dusk at 100% intensity for a set number of hours – then the LEDs remains on at a percentage of full intensity until activated by a Motion Sensor event to 100% intensity – then the LEDs illuminate at 100% intensity for a set number of hours before dawn.



Profile No.	SW1 Switch Positions								Operating Profile
	1	2	3	4	5	6	7	8	
53	1	0	1	0	1	1	1	0	2 - 25%Low - High2 - 1
54	0	1	1	0	1	1	1	0	2 - 25%Low - High4 - 1
55	1	1	1	0	1	1	1	0	2 - 50%Low - High2 - 1
56	0	0	0	1	1	1	1	0	2 - 50%Low - High4 - 1
57	1	0	0	1	1	1	1	0	4 - 25%Low - High2 - 1
58	0	1	0	1	1	1	1	0	4 - 25%Low - High4 - 1
59	1	1	0	1	1	1	1	0	4 - 50%Low - High2 - 1
60	0	0	1	1	1	1	1	0	4 - 50%Low - High4 - 1
61	1	0	1	1	1	1	1	0	6 - 25%Low - High2 - 1
62	0	1	1	1	1	1	1	0	6 - 25%Low - High4 - 1
63	1	1	1	1	1	1	1	0	Reserved

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Light Level Ramping

The EMS supports ‘quick’ and ‘slow’ modes for turning the Fixture LEDs on or off, the definitions of the modes are as below:

Quick on-The Fixture illuminates instantaneously (this is the default “on” setting).

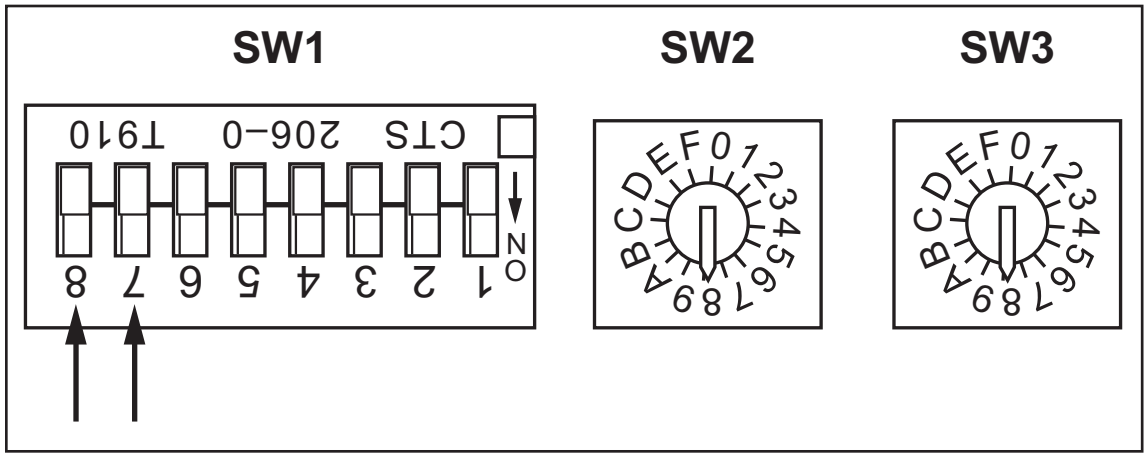
Slow on- The Fixture ramps up to full intensity over a period of two seconds.

Quick off- The Fixture turns off instantaneously.

Slow off- The Fixture ramps down gradually over a five second period (this is the default “off” setting).

Switch positions 7 and 8 of the 8-bit DIP switch SW1 are used for Light Level Ramping and do not affect Operating Profile selection, refer to page 16 for accessing the SW1 switch.

SW1 Switch Positions		Ramping Profile
7	8	
0	0	Quick On / Quick Off
1	0	Quick On / Slow Off (default)
0	1	Slow On / Quick Off
1	1	Slow On / Slow Off



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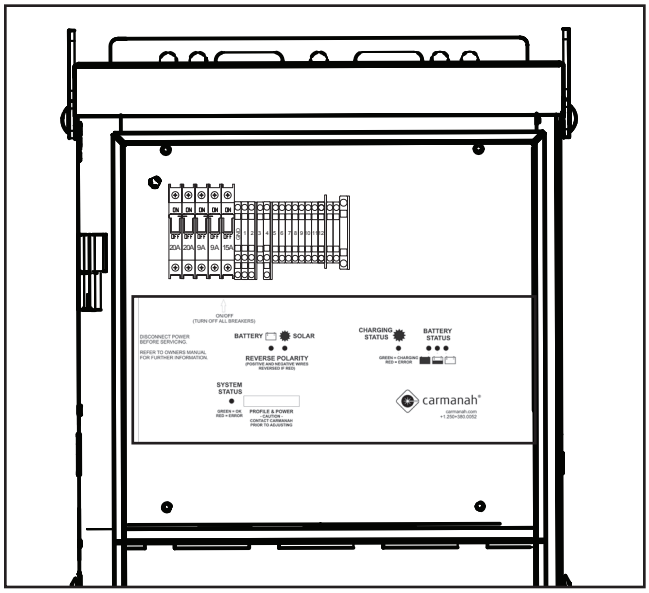
EMS Configuration

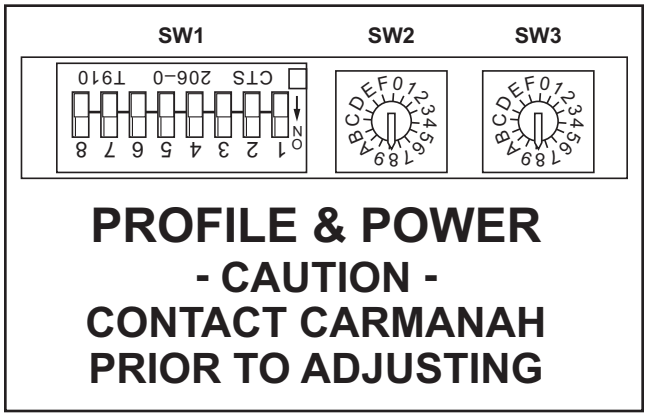
The EverGEN 1500's Energy Management System (EMS) is configured at the factory based on the profiles that were selected at the time of ordering. However, if the installation location or situation change, you can adjust these settings.

Contact your Carmanah representative before making any changes to the EMS settings. Changing the settings may result in battery damage if not performed correctly

Accessing the EMS Switches

You can configure the EverGEN 1500 using a set of switches (SW1) and rotary dials (SW2 and SW3). These switches and dials allow you to select Operating Profiles and Light Levels. Open the Control Enclosure's front door; the switches are located on the circuit board underneath the Control Panel's front plate. A slot on the Control Panel's front plate is provided to access these switches. See the figures at right.





Always turn off the EMS circuit breakers before configuring the EMS.

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Operating Profile Control

Use the 8-bit DIP switch SW1 to select an Operating Profiles. Refer to page 11 for all the available Operating Profiles.

- Use switches 1 through 6 to select the appropriate Operating Profile (refer to page 11).
- Use switches 7 and 8 to select the Light Level ramping. (Refer to page 15 for available light level ramping modes).

Light Level Control

Use the SW2 and SW3 Rotary switches to set the light level in the following finite steps:

- Rotary switch SW2 controls the light level in coarse-steps of 100mA (to a maximum of 1400mA)
- Rotary switch SW3 controls the light level in fine-steps of 10mA (to a maximum of 90mA)

Contact your Carmanah representative before making any changes to the EMS settings. Changing the settings may result in battery damage if not performed correctly.

Position	SW2 - Coarse Current Adjustment	SW3 - Fine Current Adjustment
0	0 mA	0 mA
1	100 mA	10 mA
2	200 mA	20 mA
3	300 mA	30 mA
4	400 mA	40 mA
5	500 mA	50 mA
6	600 mA	60 mA
7	700 mA	70 mA
8	800 mA	80 mA
9	900 mA	90 mA
A	1000 mA	90 mA
B	1100 mA	90 mA
C	1200 mA	90 mA
D	1300 mA	90 mA
E	1400 mA	90 mA
F	N/A[1] mA	N/A[1]

[1]This switch position is not used.

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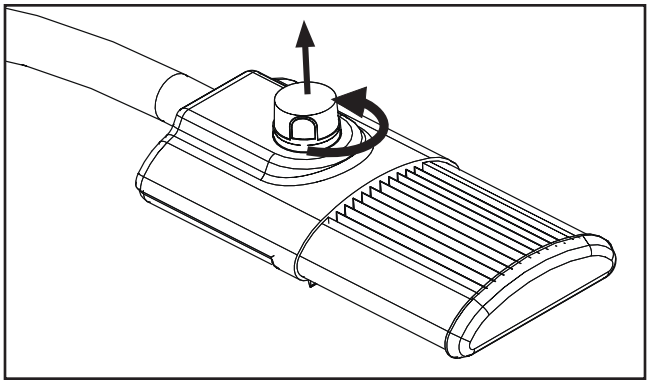
Photocontrol Replacement

The EverGEN 1500's Photocontrol is either a standard NEMA twist lock type (with a voltage of12VDC for Street and Area lighting), or a separate photocontrol attached to the Control Enclosure (for Flood Lighting applications). The Turn on/off ratio is 1:1.5, the On setting is 1 foot-candle.

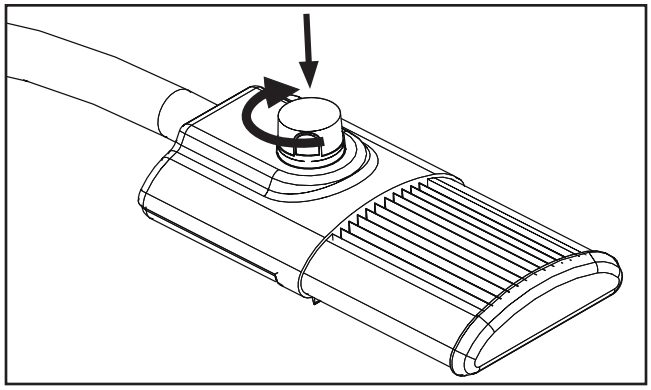
Removing a Photocontrol – NEMA Twist Lock

To remove a NEMA Twist Lock photocontrol, rotate it counterclockwise and pull it up as shown below:



Installing a Photocontrol – NEMA Twist Lock

To install a new NEMA Twist Lock photocontrol, insert it into the photocontrol socket and turn the photocontrol clockwise



Use the standard NEMA Twist lock 12 VDC photocontrol supplied by Carmanah. If you want to use a different photocontrol, consult Carmanah for verifications and approval.

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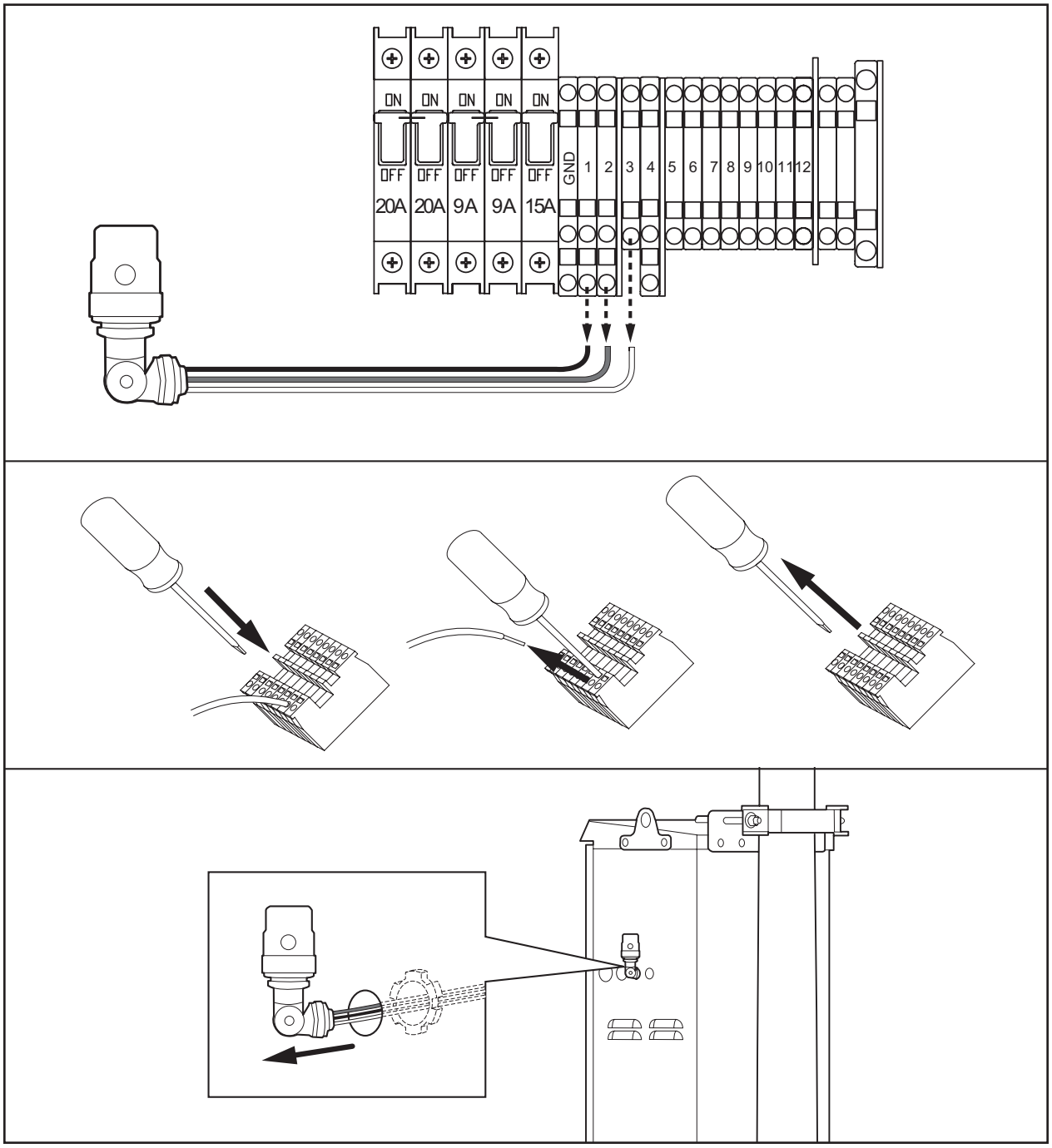
Removing a Photocontrol – Flood Lighting

WARNING

Before removing the photocontrol for Flood Lighting, open the Control Enclosure and turn off all the circuit breakers.

Remove the photocontrol wires from the Control Enclosure's terminal strip.



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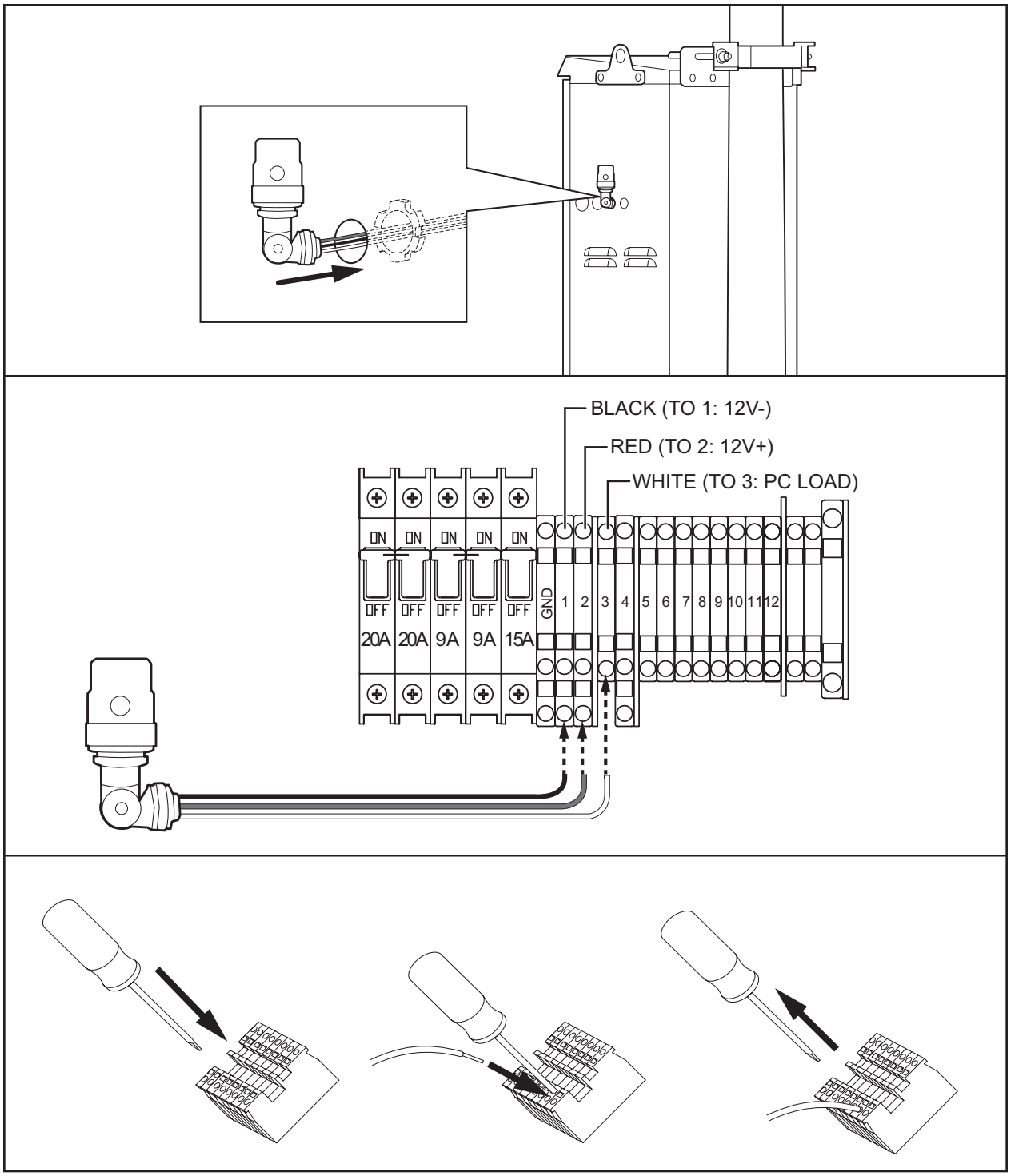
Installing a Photocontrol – Flood Lighting

Feed the wires through the hole in the Control Enclosure, and wire as indicated in the following procedure.



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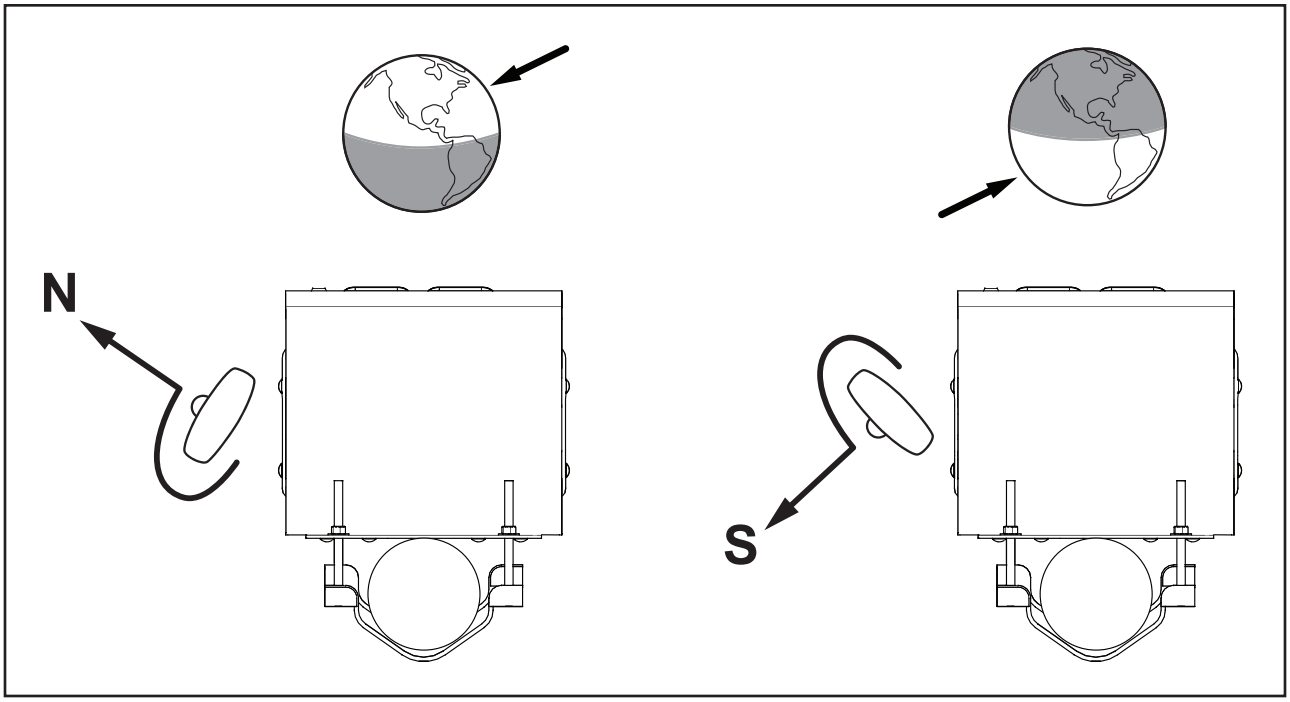
Orient the photocontrol as indicated in the following diagram:



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Adjusting the Motion Sensor

The EverGEN 1500 uses a Passive Infrared (PIR) Motion Sensor. The PIR detects the difference between infrared energy in motion and the background space.

The Motion Sensor's Light Level and Time Delay adjustment trim-pots are located under the lens assembly (see Figure A). Additional positions for time delay settings are also shown in Figure A.

- The Light Level is factory-set at maximum (fully clockwise)
- The Time Delay is factory-set at 30 seconds (fully counterclockwise)

To adjust the Time Delay, carefully unscrew the lens assembly. Do not remove the metal nut; it holds the sensor in place and ensures water seal to the lighting fixture.

Light Level Adjustment

Leave the Light Level setting at maximum, do not change this setting.

Time Delay Adjustment

The Time Delay is the amount of time that elapses between the Motion Sensor detecting motion and illuminating the Fixture, and when the Fixture turns off. You can set this Time Delay from 30 seconds (fully counterclockwise) to 30 minutes (fully clockwise) Additional positions for time delay settings are shown in Figure A.

In areas where there is mostly walk-through movement, set the Time Delay low (for example, one minute). In areas where people may stop and remain for period of time, set the Time Delay to a higher amount (for example, 10 minutes).

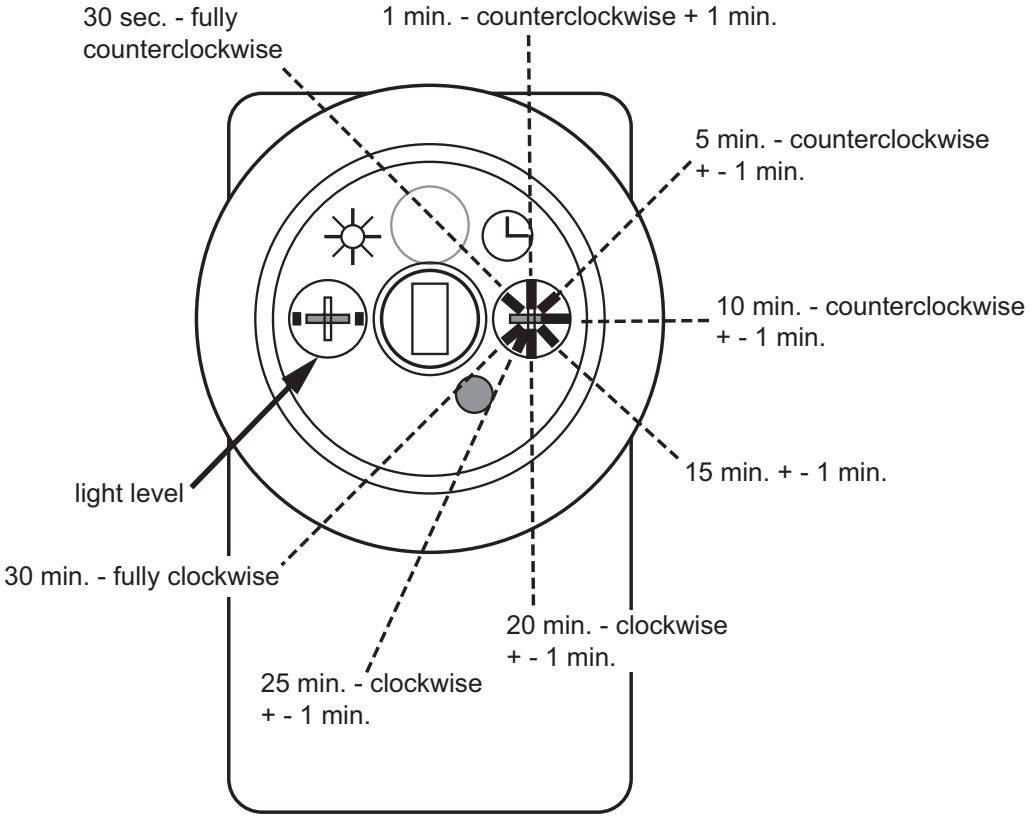
30 sec. - fully counterclockwise
1 min. - counterclockwise + 1 min.
5 min. - counterclockwise + - 1 min.
10 min. - counterclockwise + - 1 min.
15 min. + - 1 min.
light level
30 min. - fully clockwise
20 min. - clockwise + - 1 min.
25 min. - clockwise + - 1 min.

Figure A: Additional Time Delay Settings

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Battery Replacement

To replace the EverGEN 1500's battery bank, use the following procedure:

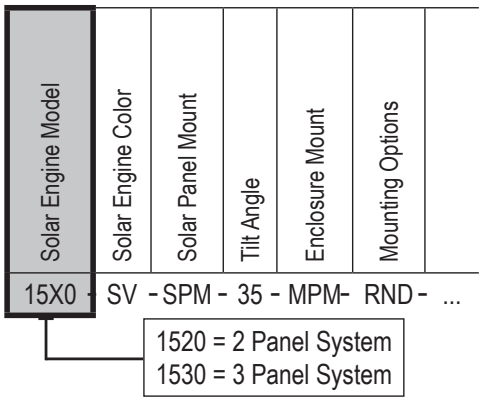
1. Turn off all the Circuit Breakers.
2. Disconnect the series connections cables.
3. Disconnect the positive and negative cables (ring terminals) coming from the EMS Control Panel at the battery terminals.
4. Disconnect the parallel connections between battery pairs.
5. Release the battery straps.
6. Remove the batteries from the Control Enclosure.

Battery Installation

WARNING

The batteries used in the EverGEN 1500 series system are large-capacity batteries. Use caution when installing the batteries, and follow the installation instructions carefully. Short-circuiting the batteries may cause a large current discharge, leading to battery damage and/or personal injury.

The Part Number Key and table below describes the battery and engine combinations:


Solar Engine Model
Solar Engine Color
Solar Panel Mount
Tilt Angle
Enclosure Mount
Mounting Options
15X0 - SV - SPM - 35 - MPM - RND - ...
1520 = 2 Panel System
1530 = 3 Panel System

Engine	Battery
1520 (2 panels)	4 - EX-1050, 105 Ah
1530 (3 panels)	4 - EX-1500, 139 Ah

NOTE

A silicon or petroleum grease should be applied to the battery terminals and fasteners to prevent corrosion (not supplied).

WARNING

Ensure that you use proper lifting techniques when moving batteries.

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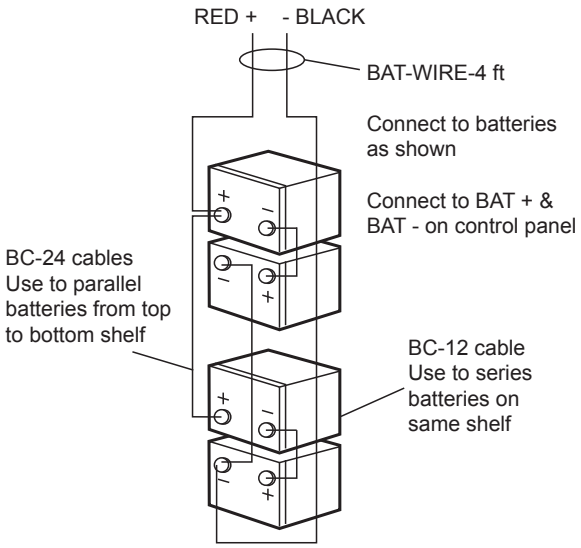
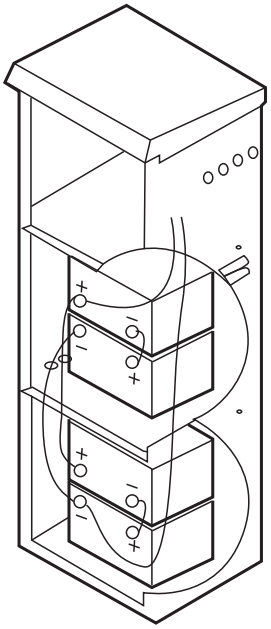
The following steps refer to the Battery Wiring illustrations.

1. Install the batteries on their sides.

2. Make the series connections first, using the short black cables provided and the supplied ¼" (6.3mm) hardware. Tighten to **12 lbf·ft (16 N·m).** Place boots over terminals.

3. Make parallel connections between battery pairs using the provided cables. Use the longer cables provided for parallel wiring from shelf to shelf. Use grommets provided to pass through the shelf. Install the terminal boots provided over both the battery cables pre-assembled to the EMS Control Panel as well as the interconnects. Attach the cables to the battery terminals. When assembling the battery cables from the EMS Control Panel, make the connections to opposite corners of the Battery Bank as shown to ensure balanced battery charging and discharging. Tighten the ¼" (6.3mm) hardware to **12 lbf·ft (16 N·m)**. Place boots over terminals.


RED +
- BLACK
BAT-WIRE-4 ft
Connect to batteries as shown
Connect to BAT + & BAT - on control panel
BC-24 cables Use to parallel batteries from top to bottom shelf
BC-12 cable Use to series batteries on same shelf



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Functional Test

Perform the following Functional Tests to determine if your EverGEN 1500 is ready for daily use:

- Check that the system and all its components are securely mounted: check the mounting structure attachments and Control Enclosure to the pole or mounting surface.
- Ensure that the proper polarity of the batteries and Solar Array has been observed. Failure to have the correct polarity will not damage the system, but the system will not function until the proper polarity exists.

Perform the following steps to complete an EverGEN 1500 functional test. If any area fails, determine why before proceeding with the Functional Test.

NOTE Refer to the Troubleshooting section to address many of the problems you may encounter.

1. **After ensuring the correct polarity,** apply battery (DC) power by turning on the Battery Bank 20A DC circuit breakers. The charge controller circuit powers up and the Battery Status LEDs blink in sequence one time. Depending on the battery bank's SOC, one of the LEDs will illuminate. During the first install the green LED must illuminate, if not; complete step 2 but stop at step 3 until the batteries are fully recharged (keeping the 9A circuit breakers off for few days will let the system recharge the batteries).

2. To apply Solar Power, turn on the Solar Array 15A DC circuit breaker. The charging status LED illuminates when charging during the day and off at night.

3. To apply power to the EMS, turn on the 9A DC circuit breakers. The fixture's LEDs illuminate after one second. The LEDs illuminate at 25% power for the first five minutes. During start-up, the EMS confirms whether or not the fixtures are connected to the drivers; if not, the drivers are turned off to conserve power.

After this initial start-up period, the EverGEN 1500 detects daylight conditions, and either turns off the LEDs (if the ambient light is above 1.5 foot candles), or turn on the LEDs (if the ambient light is below 1 fc.)

The system now is functioning.

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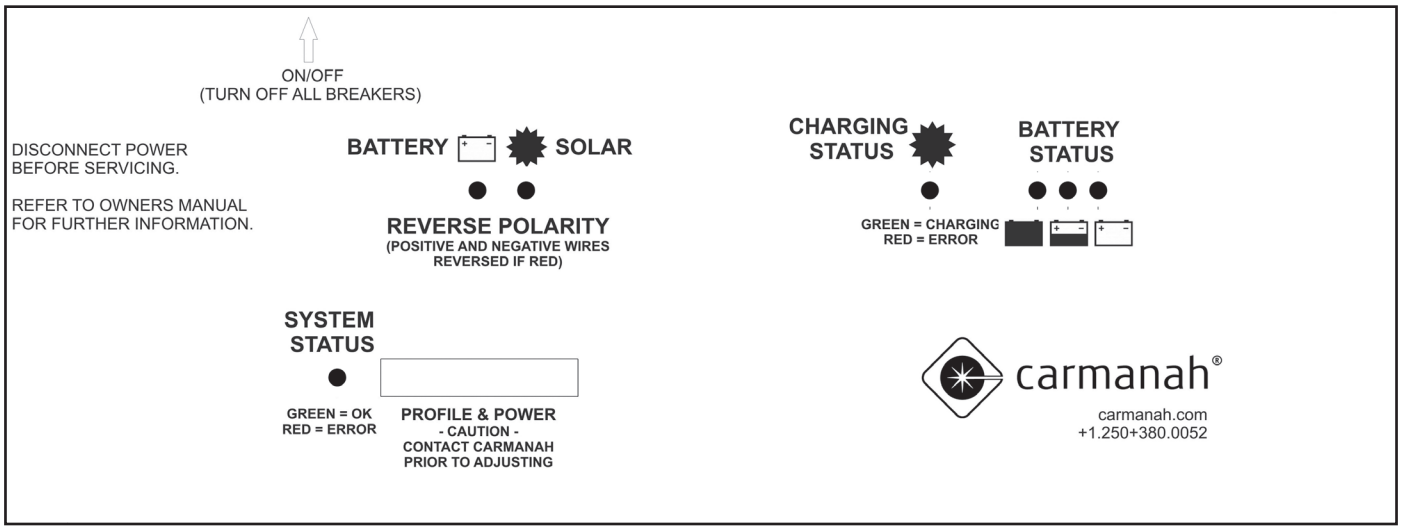
Troubleshooting

The EverGEN 1500's initial start-up takes approximately five minutes. Day-to-night detection does not occur within this time period, and the system output is approximately 25% of the full output. The EverGEN 1500 Control Panel has indicator lights for system functions and diagnostics. The following is a picture of the EverGEN 1500 Control Panel:



Light Output Appears Dim

If your system does not operate according to its specifications, the unit may be using Automatic Light Control (ALC). If the battery's State of Charge (SOC) drops below 60%, ALC engages and reduces the power output to protect the batteries under unusually poor solar conditions. If the Battery Status light is red or yellow, the battery is low on charge. The system will recover on its own. However, the unit may be allowed to self charge with the load turned off by turning off the EMS breakers (9A breakers), while leaving the remaining breakers in the on position. Self-charging may take several days depending on the current solar conditions. The light will not come on until the EMS is powered again (9A breakers are turned on).

The Fixture is Blinking, or the System Status Light is Red

If the fixture is blinking once a second (low battery shutdown) ensure that the Solar Array is not covered by debris or dirt, and that they tilt and orientation is correct. If required, remove the debris or clean the Solar Array with a soft cloth and water. Wait at least 24 hours for the system to recover. If it does not recover, contact Carmanah for customer support.

If the fixture is blinking twice a second (24-hour shutdown), the photocontrol may be damaged or inoperable. Turn off the EMS breakers (9A). The system can be tested during the daytime by disconnecting the photocontrol input on the terminal strip (orange wire, Terminal 3). Turn the system back on, and wait for the five minute start-up to complete. The light should turn off. Reconnect the wire (without turning off the breakers) and wait one minute. If the light turns on again, then the photocontrol is damaged and needs to be replaced. If the unit is still inoperable, contact Carmanah for customer support.

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Fixture Illuminates and Ramps Off

If the Fixture immediately illuminates to peak brightness, and the immediately ramps off over the following five seconds it indicates that the Motion Sensor is over budget.

This only occurs when the Motion Sensor is activated at night, but the budget for Motion Sensor's activation time (allotted by the Operating Profile) has already been met for that night. If this happens every night, consider selecting a different Operating Profile (always consult Carmanah before changing the Operating Profile).

Reverse Polarity

If either of the Reverse Polarity lights is lit, turn off all breakers and reinstall the wires in the correct order.

Charging Status Error

If the Charging Status is red, contact Carmanah for customer support

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Product Care

EverGEN 1500 systems are designed to operate reliably for years with virtually no need for maintenance. Carmanah recommends occasional visual inspections of the Solar Panels to ensure that they are clean and unobstructed by anything that could prevent the effectiveness of the solar charging, including:

- dirt and dust
- snow
- leaves
- debris
- shade that may have developed after installation due to adjacent plant growth

The frequency of the inspections depends on your location and the local weather patterns. EverGEN 1500 systems installed with an inclination at or near horizontal typically require more frequent inspection than systems installed at a greater angle. A yearly visual inspection of the EverGEN 1500 systems is usually sufficient.

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Appendix A: Error Codes

When you open the Control Enclosure's front door, you will see a series of lights on the Control Unit's front panel. You can use these lights to diagnose operating issues with the 1500 Series light.

This table indicates the specific error code and provides a description of the error and any potential solutions.

Error Code	Description/Solution
System Status LED Error Indications	
Flashing **Green** once per second	System is working properly.
Flashing **Red** once per second	Low Voltage Discharge. Charge the batteries as soon as possible.
Flashing **Red** twice per second	24 hour shutdown. This indicates that the light has not detected a change of state in the past 24 hours and has shut down as a result. This typically indicates an error with the photo cell.
Reverse Polarity LED Error Indications	
Solid **Red** (Solar)	Polarity is reversed – switch the positive and negative connections.
Solid **Red** (Battery)	Polarity is reversed – switch the positive and negative connections.
Charging Status LED Error Indications	
Solid **Red** (heartbeat indication flickers the Status LED off briefly every 5 seconds)	Indicates one of the following: • Damaged local temperature. Sensor • Damaged heatsink temperature. sensor • Damaged input MOSFETs • Firmware Error
Flashing **Red**	Indicates one of the following issues: • PV High Voltage Disconnect • RTS Shorted • RTS Disconnected
Battery Status LED Error Indications	
Red – Green Sequencing	Load High Voltage Disconnect
Red – Yellow Sequencing	High Temperature Disconnect
Yellow/Red – Green/Yellow Sequencing	Remote Temperature. Sensor Error
Green/Red – Yellow Sequencing	External Wiring Error
Yellow/Red – Green Sequencing	Load Overcurrent
Green/Red – Yellow Sequencing	Load Short Circuit
Green/Yellow/Red Flashing	Custom Setpoints Update
Red – Yellow – Green Sequencing	Self-test Error

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Appendix B: Acronyms

Term	Description
AGM	Absorbed Glass Matt
Carmanah	Carmanah Technologies Corporation
CEC	Canadian Electrical Code
CSA	Canadian Standards Association
DC	Direct Current
EMS	Energy Management System
EPA	Effective Projected Area
HPS	High Pressure Sodium
LVD	Low Voltage Disconnect
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
PV	Photovoltaic
UL	Underwriters Laboratories Incorporated

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Appendix C: Warranty

This product is covered by the Carmanah warranty. Visit www.carmanah.com/content/products/warranty/ for additional information or to register your product online.

Before contacting Carmanah's customer service department, please have the serial numbers of your Windsock system available, a brief description of the problem, as well as all details of the installation.

To contact Carmanah's Customer Service Department:

Mail: Carmanah Technologies Corporation
Building 4, 203 Harbour Road
Victoria, BC Canada V9A 3S2

Phone: 1.250.380.0052
877.722.8877 (Toll Free in U.S. and Canada)

Fax: 1.250.380.0062

Email: customerservice@carmanah.com

Website: carmanah.com

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